THE CLAIMS

The claims of the application are amended as follows:

1. (Currently Amended) Stand-alone multiple gas analysis apparatus comprising: an FT-IR gas analyzer, including a product case, an infrared radiation source, an interferometer, a gas sample cell, an infrared detector having an associated preamplifier, and optics operatively disposed for transmitting radiation between said radiation source, said interferometer, said gas sample cell and said detector, said radiation source, said interferometer, said gas sample cell, said detector and preamplifier, and said optics all being enclosed within said FT-IR gas analyzer product case, said FT-IR gas analyzer additionally including a single gas inlet conduit connected to said gas sample cell for conducting gas to said gas cell from a location external to said product case and having at least a portion of its length enclosed within said product case, and a single gas outlet conduit connected to said gas sample cell for conducting gas from said gas sample cell to a location external to said product case and having at least a portion of its length enclosed within said product case, said single gas inlet conduit, said single gas outlet conduit, and said gas sample cell cooperatively defining a gas flow path for gas to be analyzed; and at least one sensor, enclosed within said FT-IR product case and integrated into structure defining said gas flow path for contact by the gas to be analyzed, said at least one sensor being constructed for the analysis of molecular oxygen and ~~operatively connected to said gas sample cell of said FT-IR gas analyzer~~ for generating an electrical signal representative of the concentration of molecular oxygen; said analysis apparatus being devoid of gas analysis means disposed external to said FT-IR gas analyzer product case and operatively connected to said gas flow path for contact by the gas to be analyzed ~~at least one atomic or homonuclear diatomic gaseous infrared inactive component of a gas sample passing through, or contained within, said cell~~.

2. (Canceled)

3. (Original) The apparatus of Claim 1 wherein said FT-IR gas analyzer includes electronic data processing means programmed to determine the presence of infrared-active molecules in the gas sample, said electronic data processing means being operatively connected to said at least one sensor for improving the accuracy of gas-concentration data, in the signal from said at least one sensor, by adjusting said data as necessary to account for such infrared-active molecules.

4. (Currently Amended) The apparatus of Claim 1 additionally including a second sensor that is constructed for the analysis of molecular hydrogen and for generating an electrical signal representative of the concentration of molecular hydrogen, said second sensor also being enclosed within said FT-IR product case and integrated into said structure defining said gas flow path for contact by the gas to be analyzed ~~wherein said gaseous infrared-inactive component to which said at least one sensor is responsive is selected from the group consisting of molecular oxygen, hydrogen, nitrogen, arsenic, lithium, chlorine, fluorine, bromine and iodine, and atomic helium, neon, argon and krypton~~.

5. (Currently Amended) The apparatus of Claim 1 wherein said at least one sensor comprises a porous ceramic element having electrical properties that vary in relation to the concentration of molecular oxygen ~~the infrared-inactive component~~ in effective contact therewith.

6. (Original) The apparatus of Claim 5 wherein said at least one sensor comprises a diffusion barrier of either the pinhole or Knudsen type.

7. (Original) The apparatus of Claim 5 wherein said at least one sensor is a limiting current-type oxygen sensor.

8. (Original) The apparatus of Claim 7 wherein said at least one sensor has integral self-heating means, and wherein said porous ceramic element thereof comprises zirconia.

9. (Currently Amended) The apparatus of Claim 4 ~~5~~ wherein said second ~~at least one~~ sensor is a hydrogen sensor of the type that exhibits a change in resistance in relation to the concentration of molecular hydrogen in effective contact therewith.

10. (Original) The apparatus of Claim 9 wherein said at least one sensor comprises an array of nanotubes.

11. (Original) The apparatus of Claim 10 wherein said nanotubes are of titania fabrication.

12. (Currently Amended) A method for the analysis of a mixed gas sample, comprising:

passing a sample of a mixed gas along a gas flow path into or through the sample cell of an FT-IR gas analyzer, said mixed gas sample containing molecular oxygen and at least one infrared-active component ~~and at least one infrared-inactive component~~;

measuring, by FT-IR analysis, the concentration of said at least one infrared-active component in said mixed gas sample; and

concurrently measuring the concentration of molecular oxygen ~~said at least one infrared-inactive component~~ in said mixed gas sample by effecting contact of said sample with at least one sensor ~~operatively connected to said sample cell and~~ constructed for generating an electrical signal representative of the concentration of molecular oxygen; said FT-IR gas analyzer including a product case, an infra-

red radiation source, an interferometer, a gas cell, an infrared detector having an associated preamplifier, and optics operatively disposed for transmitting radiation between said radiation source, said interferometer, said gas cell and said detector, said radiation source, said interferometer, said gas cell, said detector and preamplifier, and said optics all being enclosed within said FT-IR gas analyzer product case, said FT-IR gas analyzer additionally including a single gas inlet conduit connected to said gas cell for conducting gas to said gas cell from a location external to said product case and having at least a portion of its length enclosed within said product case, and a single gas outlet conduit connected to said gas cell for conducting gas from said gas cell to a location external to said product case and having at least a portion of its length enclosed within said product case, said single gas inlet conduit, said single gas outlet conduit, and said gas cell cooperatively defining said gas flow path for gas to be analyzed; and at least one sensor, enclosed within said FT-IR product case and integrated into structure defining said gas flow path for contact by the gas to be analyzed, said at least one sensor being constructed for the analysis of molecular oxygen and for generating an electrical signal representative of the concentration of molecular oxygen; said analysis apparatus being devoid of gas analysis means disposed external to said FT-IR gas analyzer product case and operatively connected to said gas flow path for contact by the gas to be analyzed; ~~said at least one infrared-inactive component~~ said sample of mixed gas being passed into contact with no gas analysis means upstream or downstream of said FT-IR gas analyzer along said gas flow path defined therein.

13. (Canceled)

14. (Original) The method of Claim 12 wherein said FT-IR gas analyzer includes electronic data processing means programmed to determine the presence of infrared-active molecules in said mixed gas sample, said electronic data processing means being operatively connected to said at least one sensor for improving

the accuracy of gas-concentration data, in said signal from said at least one sensor, by adjusting said data as necessary to account for such infrared-active molecules.

15. (Currently Amended) The method of Claim 12 wherein said FT-IR gas analyzer additionally includes a second sensor that is constructed for the analysis of molecular hydrogen and for generating an electrical signal representative of the concentration of molecular hydrogen, said second sensor also being enclosed within said FT-IR product case and integrated into said structure defining said gas flow path for contact by the gas to be analyzed ~~said gaseous infrared inactive component to which said at least one sensor is responsive is selected from the group consisting of molecular oxygen, hydrogen, nitrogen, arsenic, lithium, chlorine, fluorine, bromine and iodine, and atomic helium, neon, argon and krypton~~.

16. (Currently Amended) The method of Claim 12 wherein said at least one sensor comprises a porous ceramic element having electrical properties that vary in relation to the concentration of molecular oxygen ~~said infrared inactive component in effective contact therewith~~.

17. (Original) The method of Claim 16 wherein said at least one sensor comprises a diffusion barrier of either the pinhole or Knudsen type.

18. (Currently Amended) The method of Claim 16 wherein said at least one sensor is a limiting current-type oxygen sensor~~, and wherein the concentration of molecular oxygen in said mixed gas sample is measured in said method~~.

19. (Currently Amended) The method of Claim 18 wherein said at least one sensor has integral self-heating means, and wherein said porous ceramic element of said at least one sensor comprises zirconia.

20. (Currently Amended) The method of Claim 15 ~~16~~ wherein said at least one sensor has integral self-heating means, and wherein said second ~~at least one~~ sensor is of the type that exhibits a change in resistance in relation to the concentration of molecular hydrogen in effective contact therewith, and wherein the concentration of molecular hydrogen is measured in said method.

21. (Currently Amended) The method of Claim 20 wherein said second ~~at least one~~ sensor comprises an array of nanotubes.

22. (Original) The method of Claim 21 wherein nanotubes are of titania fabrication.

23. (New) The method of Claim 12 wherein said sample of mixed gas is obtained from the exhaust gas of a combustion process.

24. (New) A method for monitoring a combustion process, comprising:

carrying out a combustion process which produces a mixed gas exhaust stream;

obtaining samples from said mixed gas exhaust stream;

passing said samples of mixed gas along a gas flow path through an FT-IR gas analyzer, said mixed gas samples containing molecular oxygen and at least one infrared-active component;

measuring, by FT-IR analysis, the concentration of said at least one infrared-active component in each of said mixed gas samples; and

concurrently measuring the concentration of molecular oxygen in each of said mixed gas samples by effecting contact of said sample with at least one sensor constructed for generating an electrical signal representative of the concentration of molecular oxygen; said FT-IR gas analyzer including a product case, an infrared radiation source, an interferometer, a gas cell, an infrared detector having an

associated preamplifier, and optics operatively disposed for transmitting radiation between said radiation source, said interferometer, said gas cell and said detector, said radiation source, said interferometer, said gas cell, said detector and preamplifier, and said optics all being enclosed within said FT-IR gas analyzer product case, said FT-IR gas analyzer additionally including a single gas inlet conduit connected to said gas cell for conducting gas to said gas cell from said combustion process and having at least a portion of its length enclosed within said product case, and a single gas outlet conduit connected to said gas cell for conducting gas from said gas cell to a location external to said product case and having at least a portion of its length enclosed within said product case, said single gas inlet conduit, said single gas outlet conduit, and said gas cell cooperatively defining said gas flow path for said samples of mixed gas and at least one sensor, enclosed within said FT-IR product case and integrated into structure defining said gas flow path for contact by said samples of mixed gas, said at least one sensor being constructed for the analysis of molecular oxygen and for generating an electrical signal representative of the concentration of molecular oxygen; said analysis apparatus being devoid of gas analysis means disposed external to said FT-IR gas analyzer product case and operatively connected to said gas flow path for contact by said samples of mixed gas; said samples of mixed gas being passed into contact with no gas analysis means upstream or downstream of said FT-IR gas analyzer along said gas flow path defined therein.

25. (New) The method of Claim 24 wherein said FT-IR gas analyzer additionally includes a second sensor that is constructed for the analysis of molecular hydrogen and for generating an electrical signal representative of the concentration of molecular hydrogen, said second sensor also being enclosed within said FT-IR product case and integrated into said structure defining said gas flow path for contact by said samples of mixed gas, and said method measuring the concentration of

molecular hydrogen concurrently with said measurements of said at least one infrared-active component and said molecular oxgyen.

26. The apparatus of Claim 8 wherein said at least one sensor is located downstream of said gas cell.

27. The method of Claim 19 wherein said at least one sensor is located downstream of said gas cell.